

What is claimed is:

1. A method for retrieving from a destination web content data specified by a source at a source internet protocol address (IPA) and corresponding to a uniform resource locator (URL) associated with a web server, the method comprising the steps of,
destination IPA storing at a proximal IPA in a forwarding table a destination IPA,
destination URL identifier storing at the proximal IPA in the forwarding table a destination URL identifier for identifying the web content data, the destination URL identifier is stored in the forwarding table in reference to the destination IPA,
receiving from the source a source URL identifier,
matching the source URL identifier to the destination URL identifier,
cross referencing at the proximal IPA in the forwarding table the stored destination URL identifier with the destination IPA,
destination URL identifier transmitting the destination URL identifier to the destination at the destination IPA, and
transmitting from the destination at the destination IPA the web content data to retrieve the web content data from the destination.

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2. The method of claim 1 wherein,
the destination is a distal web cache,
the source is a user browser at a source IPA,
the source URL identifier is an exact URL,
the proximal IPA is an IPA of a proximal web cache,
the distal web cache transmits the web content data to the
source at the source IPA,
the method further comprising the steps of
receiving the source IPA at the proximal web cache, and
transmitting the source IPA to the distal web cache, the
distal cache transmitting the web content data to the user browser.

3. The method of claim 1 wherein,
the destination is a distal web cache,
the destination IPA is a distal web cache IPA
the source is a user browser at a source IPA,
the source URL identifier is an exact URL,
the destination URL identifier is an encoded URL,
the proximal IPA is an IPA of a proximal web cache,
the distal web cache transmits the web content data to the
proximal web cache,
the method further comprising the steps of
receiving the source IPA at the proximal web cache,
transmitting the proximal IPA to the distal web cache,
receiving from the distal web cache the web content data at
the proximal web cache, and
transmitting the web content data from the proximal web cache
to the user browser at the source IPA.

1 4. The method of claim 1 wherein the destination URL identifier in
2 the forwarding table is a series of compression codes corresponding
3 to respective linked segments of the URL, each of the linked
4 segments corresponding to one or more components of the URL to
5 decompose the URL into the linked segments, the linked segments are
6 linked by parental pointers from a first linked segment having no
7 parental pointer through remaining linked segments having
8 respective parental pointers to a preceding one of the linked
9 segments to a last linked segment reference to the destination IPA.

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13 5. The method of claim 4 wherein

14 the destination URL identifier references the URL comprising
15 scheme, name, path and type components and delimiters,

16 the linked segments correspond to successive concatenated
17 components of the URL and are respectively referenced to one or
18 more of the successive concatenated components of the URL,

19 each of the compression codes are referenced to the linked
20 segments and to the one or more successive concatenated components
21 through pointers for respectively cross referencing the compression
22 codes to the linked segments, and

23 the destination IPA is referenced to the destination URL
24 identifier when the all of the respective compression codes through
25 the respective pointers point to a complete set of linked segments
26 from the first linked segment to the last linked segment.

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1 6. The method of claim 5 wherein,

2 the proximal IPA becomes a new source IPA as the destination
3 IPA becomes a new proximal IPA communicating the destination URL
4 identifier to a new destination IPA all of which occurring a
5 plurality of times for indicating a number of hops from the
6 proximal IPA to a last one of a respective plurality of new
7 destination IPAs, the last one of the respective plurality of new
8 destination IPA distally storing the web content data, and

9 the last linked segment is further referenced to a distance
10 metric indicating a number of hops through the new destination IPAs
11 from the proximal IPA.

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1 7. The method of claim 1 wherein,
2 the destination stores a set of web content data one of which
3 is the web content data, the set of web content data corresponding
4 to a wildcard URL for indicating a set of URLs one of which is the
5 URL,
6 the destination URL identifier is a wildcard URL identifier,
7 the source URL identifier is an exact URL having a plurality
8 of URL components a first of portion of which serving as a prefix
9 to a remaining portion of the exact URL, and
10 the matching step is a prefix matching step for matching the
11 first portion of the URL components of the exact URL to the
12 wildcard URL identifier in the forwarding table.
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16 8. The method of claim 7 wherein
17 the prefix matching step is a longest prefix matching step
18 serving to match the longest first portion of the URL components of
19 the exact URL to the wildcard URL among a plurality of wildcard
20 URLs matching a shorter first portion of the URL components of the
21 exact URL.
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1 9. A method for retrieving from a distal cache web content data
2 specified by a user browser at a source internet protocol address
3 (IPA) and corresponding to a uniform resource locator (URL)
4 associated with a web server, the method comprising the steps of,
5 distal IPA storing at a proximal IPA in a forwarding table a
6 distal IPA,
7 distal URL identifier storing at the proximal IPA in the
8 forwarding table a distal URL identifier for identifying the web
9 content data, the distal URL identifier is stored in the forwarding
10 table in reference to the distal IPA,
11 receiving from the user browser a source URL identifier,
12 matching the source URL identifier to the distal URL
13 identifier,
14 cross referencing at the proximal IPA in the forwarding table
15 the stored distal URL identifier with the distal IPA,
16 distal URL identifier transmitting the distal URL identifier
17 to the distal destination at the destination IPA, and
18 transmitting from the distal cache at the distal IPA the web
19 content data to retrieve the web content data from the distal web
20 cache.

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22 10. The method of claim 9 wherein the web content data is
23 transmitted from the distal cache to the user browser during the
24 transmitting step.

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11. The method of claim 9 wherein,

the proximal IPA is a location of a proximal cache,

the web content data is transmitted from the distal cache to the proximal cache during the transmitting step, and

the web content data is further transmitted from the proximal cache to the user browser during the transmitting step.

12. A method for retrieving from a distal web cache web content

data specified by a user browser at a source internet protocol

address (IPA) and corresponding to a uniform resource locator (URL)

associated with a web server, the method comprising the steps of,

destination IPA storing at a proximal IPA in a forwarding table a distal IPA,

distal URL identifier storing at the proximal IPA in the

forwarding table a distal URL identifier for identifying the web

content data stored in the distal cache, the distal URL identifier

is stored in the forwarding table in reference to the destination

IPA,

receiving from the user browser a source URL identifier,

matching the source URL identifier to the destination URL

identifier,

cross referencing at the proximal IPA in the forwarding table

the stored distal URL identifier with the destination IPA,

distal URL identifier transmitting the distal URL identifier

to the destination at the destination IPA, and

transmitting from the destination at the destination IPA the

web content data for retrieving the web content data from the

distal cache.

1 13. The method of claim 12 further comprising the step of,
2 repeating the all of the steps one or more times, the
3 destination is one or more intermediate cooperative web caches
4 having a respective one or more intermediate IPAs and respectively
5 storing the distal URL identifier with a respective next one of the
6 one or more intermediate IPAs and lastly the distal IPA, each of
7 the one or more intermediate IPAs being a location a next one of
8 the one or more intermediate cooperative web caches and lastly the
9 distal IPA, the one or more intermediate IPAs indicating next web
10 hop locations in transmitting the distal URL through the
11 intermediate cooperative web caches to the distal web cache, the
12 last one of one or more intermediate cooperative web caches
13 referencing the distal URL to the distal IPA for retrieving the web
14 content data from the distal cache.

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16 14. The method of claim 13 wherein the repeated transmitting step,
17 the web content data is transmitting from the distal cache
18 through the one or more intermediate web caches and through a
19 proximal cache at the proximal IPA to the user browser.

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21 15. The method of claim 14 further comprising the step of,
22 assigning the proximal cache and one or more intermediate
23 caches and the distal cache to one or more groups of cooperative
24 caches in a network of grouped cooperative web caches, the web
25 content data being transmitted from a first one of the one or more
26 intermediate caches to a second one of the one or more intermediate
27 caches, the first one and second one of the one or more
28 intermediate caches being within the same group.